Change Sheet for Ammonia Basin Plan Amendment

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
1	¶4	Replace	receiving with inland surface
1	¶4	Insert	Characteristic of freshwater (as determined by the implementation provisions below)
1	¶4	Replace	3-4 with 3-3
1	¶4	Insert	Per … s' most recent criteria guidance document
2	¶2	Insert	Shall
2	¶2	Delete	More than once every three years on the average
2	#1	Replace	Criterion with objective
2	#2	Delete	More than once every three years on the average
2	#2	Replace	Criterion with objective
2	Footnotes	Insert	CMC=Criteria Maximum Concentration and CCC=Criteria Continuous Concentration
2	#3	Replace	CCC for chronic objective
3	End of pg.	Insert	For inland surface waters characteristic of saltwater (as determined by the implementation provisions below), concentrations of total ammonia as nitrogen shall not exceed the following[6]: 1. A six-month median of 0.60 μg/L 2. A daily maximum of 2.40 μg/L 3. An instantaneous maximum of 6.00 μg/L

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
			The six-month median shall apply as a moving median of daily values for any 180-day period in which daily values represent flow weighted average concentrations within a 24-hour period. The daily maximum shall apply to flow weighted 24-hour composite samples. The instantaneous maximum shall apply to grab sample determinations.
3	Footnote at end of pg.	Insert	Taken from the "Water Quality Control Plan for Ocean Waters of California" (California Ocean Plan) (2001).
5	Title of chart	Replace	Criteria with Objective
5	Bottom of chart	Insert	* At 15 C and above, the chronic objective for ELS absent is the same as that for ELS present.
6	Under title Implementation Provisions for the Application of Ammonia Objectives to Inland Surface Waters in the Los Angeles Region	Insert	**Selection of Freshwater vs. Saltwater Objectives[4]** (1) For waters in which the salinity is equal to or less than 1 part per thousand 95% or more of the time, the applicable objectives are the freshwater objectives. (2) For waters in which the salinity is equal to or greater than 10 parts per thousand 95% or more of the time, the applicable objectives are the saltwater objectives. (3) For waters in which the salinity is between 1 and 10 parts per thousand, the applicable objectives are the more stringent of the freshwater or saltwater objectives. However, the Regional Board may by adoption of a resolution at a publicly noticed Board meeting approve the use of the alternative freshwater or saltwater objectives for an enclosed bay or estuary with findings that scientifically defensible information and data demonstrate that on a site-specific basis the biology of the water body is dominated by freshwater aquatic life and that freshwater objectives are more appropriate; or conversely, the biology of the water body is dominated by saltwater aquatic life and that saltwater objectives are more appropriate.
6	Footnote at	Insert	The procedure described in this section to determine whether freshwater or saltwater

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
	end of page		objectives should be applied is the same method employed in the California Toxics Rule (title 40, Code of Federal Regulations, § 131.38(c)(3)) .
6	¶2	Replace	Acute Objective – Warm vs. Cold with Selection of Acute Objective – Salmonids Present vs. Salmonids Absent
6	¶2, before designated	Insert	Not
6	¶2, third line	Replace	WARM with COLD
6	¶3, title	Insert	Selection of
6	¶3	Delete	Existing for
6	¶4	Replace	Criteria with objectives
6	Translation of Objectives into Effluent Limits	Replace entire section with	**Translation of Objectives into Effluent Limits[6]** If the Regional Board determines that water quality based effluent limitations are necessary to control ammonia in a discharge, and a Total Maximum Daily Load (TMDL) for ammonia is not in effect, the permit shall contain effluent limitations for ammonia using one of the following methods: 1. Use the following procedure based on a steady-state model: Step 1: Identify the applicable water quality objectives for ammonia. Step 2: For each water quality objective, calculate the effluent concentration allowance (ECA) using the following steady-state mass balance model: If a mixing zone has not been authorized by the Regional Board: ECA = WQO

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
			If a mixing zone has been authorized by the Regional Board.[7] $$ECA = \frac{WQO(Qd + Qs) - (CsQs)}{Qd}$$ Where WQO = water quality objective Cs = Pollutant Concentration of Upstream (mg/L) Qd = Flow Discharge (mgd or cfs) Qs = Flow Upstream (mgd or cfs) For the acute objective (CMC), one of the following shall be used for the Qs term: 1. the lowest one-day flow based on a three-year return interval (1B3) when flow records are analyzed using EPA's 1986 DFLOW procedure.[8] 2. the lowest one-day flow based on a ten-year return interval (1Q10) when flow records are analyzed using extreme-value statistics.[9] 3. Other appropriate critical flow condition. For the chronic objective (CCC), one of the following shall be used for the Qs term: 1. the lowest 30-day flow based on a three-year return interval (30B3) when flow records are analyzed using EPA's 1986 DFLOW procedure or 2. the 30Q10 or the 30Q5 (lowest 30-day flow based on a ten or five-year return interval) when flow records are analyzed using extreme-value statistics. 3. Other appropriate critical flow condition. Effluent concentration allowances based on a critical condition of 30Q10 are

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
			protective of both the 30-day average and the 4-day average. If a 30Q5 is used, it must be demonstrated that the 7Q10 (seven-day low flow which recurs once every ten years on the average) is protective of 2.5 times the CCC, to ensure that short-term (4-day) chronic toxicity does not occur. The more stringent (i.e. lower) of the 30Q5 or the 7Q10 shall be used. Step 3: For each ECA calculated in Step 2, determine the long-term average discharge condition (LTA) by multiplying the ECA with a factor (multiplier) that adjusts for effluent variability. The multiplier shall be calculated as described below, or shall be found in Table 3-4. To use Table 3-4, the coefficient of variation (CV)[10] for the effluent ammonia concentration must first be calculated. If (a) the number of effluent data points is less than 10, or (b) at least 80 percent of the effluent data are reported as not detected, then the CV shall be set equal to 0.6. When calculating the CV in this procedure, if a data point is below the detection limit in an effluent sample, one-half the detection limit shall be used as the value in the calculation. Multipliers for acute, sub-chronic, and chronic objectives for ammonia that correspond to the CV can be found in Table 3-4. ECA Multipliers: ECA multiplier$_{acute99} = e^{\left(0.5\sigma^2 - z\sigma\right)}$ ECA multiplier$_{sub\text{-}chronic99} = e^{\left(0.5\sigma_4^2 - z\sigma_4\right)}$ ECA multiplier$_{chronic99} = e^{\left(0.5\sigma_{30}^2 - z\sigma_{30}\right)}$

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
			Where σ = standard deviation $\sigma = \left[\ln\left(CV^2+1\right)\right]^{0.5}$ $\sigma^2 = \ln\left(CV^2+1\right)$ $\sigma_4 = \left[\ln\left(CV^2/4+1\right)\right]^{0.5}$ $\sigma_4^2 = \ln\left(CV^2/4+1\right)$ $\sigma_{30} = \left[\ln\left(CV^2/30+1\right)\right]^{0.5}$ $\sigma_{30}^2 = \ln\left(CV^2/30+1\right)$ z = 2.326 for 99th percentile probability basis LTA Equations: $LTA_{acute99} = ECA_{acute} * ECA\ multiplier_{acute99}$ $LTA_{sub\text{-}chronic99} = ECA_{sub\text{-}chronic} * ECA\ multiplier_{sub\text{-}chronic99}$ $LTA_{chronic99} = ECA_{chronic} * ECA\ multiplier_{chronic99}$ Step 4: Select the lowest (most limiting) of the LTAs derived in Step 3 (LTA_{min}). Step 5: Calculate water quality based effluent limitations (a maximum daily effluent limitation, MDEL, and an average monthly effluent limitation, AMEL) by multiplying

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
			LTA_{min} (as selected in Step 4) with a factor (multiplier) that adjusts the averaging period and exceedance frequency of the objective, and the effluent monitoring frequency, as follows: MDEL and AMEL Equations: MDEL = LTA_{min} * MDEL $multiplier_{99}$ AMEL = LTA_{min} * AMEL $multiplier_{95}$ The MDEL and AMEL multipliers shall be calculated as described below, or shall be found in Table 3-5 using the previously calculated CV and monthly sampling frequency (n) of ammonia in the effluent. If the LTA_{min} selected in Step 4 is $LTA_{sub-chronic99}$ and the sampling frequency is four times per month or less, then n shall be set equal to 4. If the LTA_{min} selected in Step 4 is $LTA_{chronic99}$ and the sampling frequency is 30 times per month or less, then n shall be set equal to 30. MDEL and AMEL Mulitipliers: MDEL $multiplier_{99}$ = $e^{\left(z\sigma-0.5\sigma^2\right)}$ Where z = 2.326 for 99th percentile probability basis $\sigma=\left[\ln\left(CV^2+1\right)\right]^{0.5}$ $\sigma^2=\ln\left(CV^2+1\right)$ AMEL $multiplier_{95}$ = $e^{\left(z\sigma_n-0.5\sigma_n^2\right)}$

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
			Where z = 1.645 for 95th percentile probability basis $\sigma_n = \left[\ln\left(CV^2/n+1\right)\right]^{0.5}$ $\sigma_n^2 = \ln\left(CV^2/n+1\right)$ n = number of samples per month 2. Apply a dynamic model approved by the Regional Board.
6	Bottom of page	Insert footnotes	The method whereby objectives are translated to effluent limits is similar to the method contained in the "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (2000). The method is also consistent with that outlined in the U.S. EPA "Technical Support Document for Water Quality-based Toxics Control. Mixing zones are authorized on a discharge-by-discharge basis per the mixing zone provision in Chapter 4 of the Basin Plan. U.S. EPA procedure that counts each low flow value during the year and treats it as a separate event. U.S.G.S. procedure that counts only one value per year, the lowest daily flow in that year, and therefore does not consider the duration of such low flows that may occur in each year.

Page in Feb 6, 2000 Version	Location in Feb 6, 2000 Version	Action	Added or Deleted Text
			The coefficient of variation (CV) is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Insert at end of Amendment

Table 3-4 - Effluent Concentration Allowance (ECA)
Multipliers for Calculating Long-Term Averages (LTAs)

Coefficient of Variation (CV)	Acute Multiplier	Chronic Multiplier	Chronic Multiplier
	99th Percentile Occurrence Probability	99th Percentile Occurrence Probability 4 day	99th Percentile Occurrence Probability 30 day
0.1	0.797	0.891	0.959
0.2	0.643	0.797	0.919
0.3	0.527	0.715	0.882
0.4	0.440	0.643	0.846
0.5	0.373	0.581	0.812
0.6	0.321	0.527	0.78
0.7	0.281	0.481	0.75
0.8	0.249	0.440	0.721
0.9	0.224	0.404	0.693
1.0	0.204	0.373	0.667
1.1	0.187	0.345	0.642
1.2	0.174	0.321	0.619
1.3	0.162	0.300	0.596
1.4	0.153	0.281	0.575
1.5	0.144	0.264	0.555
1.6	0.137	0.249	0.535
1.7	0.131	0.236	0.517
1.8	0.126	0.224	0.5
1.9	0.121	0.214	0.483
2.0	0.117	0.204	0.468
2.1	0.113	0.195	0.453
2.2	0.110	0.187	0.438
2.3	0.107	0.180	0.425
2.4	0.104	0.174	0.412
2.5	0.102	0.168	0.4
2.6	0.100	0.162	0.388
2.7	0.098	0.157	0.377
2.8	0.096	0.153	0.366
2.9	0.094	0.148	0.356
3.0	0.093	0.144	0.346
3.1	0.091	0.141	0.337
3.2	0.090	0.137	0.328
3.3	0.089	0.134	0.32
3.4	0.088	0.131	0.312
3.5	0.087	0.128	0.304
3.6	0.086	0.126	0.297
3.7	0.085	0.123	0.29
3.8	0.084	0.121	0.283
3.9	0.083	0.119	0.277
4.0	0.082	0.117	0.271

Table 3-5 - Long Term Average (LTA) Multipliers for Calculating Effluent Limitations

Coefficient of Variation	MDEL Multiplier	AMEL Multiplier		
	99th Percentile Occurrence Probability	95th Percentile Occurrence Probability		
(CV)		n=4	n=8	n=30
0.1	1.25	1.08	1.06	1.03
0.2	1.55	1.17	1.12	1.06
0.3	1.90	1.26	1.18	1.09
0.4	2.27	1.36	1.25	1.12
0.5	2.68	1.45	1.31	1.16
0.6	3.11	1.55	1.38	1.19
0.7	3.56	1.65	1.45	1.22
0.8	4.01	1.75	1.52	1.26
0.9	4.46	1.85	1.59	1.29
1.0	4.90	1.95	1.66	1.33
1.1	5.34	2.04	1.73	1.36
1.2	5.76	2.13	1.80	1.39
1.3	6.17	2.23	1.87	1.43
1.4	6.56	2.31	1.94	1.47
1.5	6.93	2.40	2.00	1.50
1.6	7.29	2.48	2.07	1.54
1.7	7.63	2.56	2.14	1.57
1.8	7.95	2.64	2.20	1.61
1.9	8.26	2.71	2.27	1.64
2.0	8.55	2.78	2.33	1.68

If a Total Maximum Daily Load (TMDL) for ammonia is in effect, the permit shall contain effluent limitations for ammonia that are based on the allocation for ammonia in the TMDL. The allocation to a permitee would then be translated into an effluent concentration to determine the effluent limits for the permit.